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A COMBINATION OF

"MUNICIPAL JOURNAL AND PUBLIC WORKS" and "CONTRACTING"



MAKING HEAVY REPAIRS ON NEW YORK HIGHWAY AFTER THE SPRING BREAK-UP

Description of this work will be given in next week's issue

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AUGUST 7, 1920

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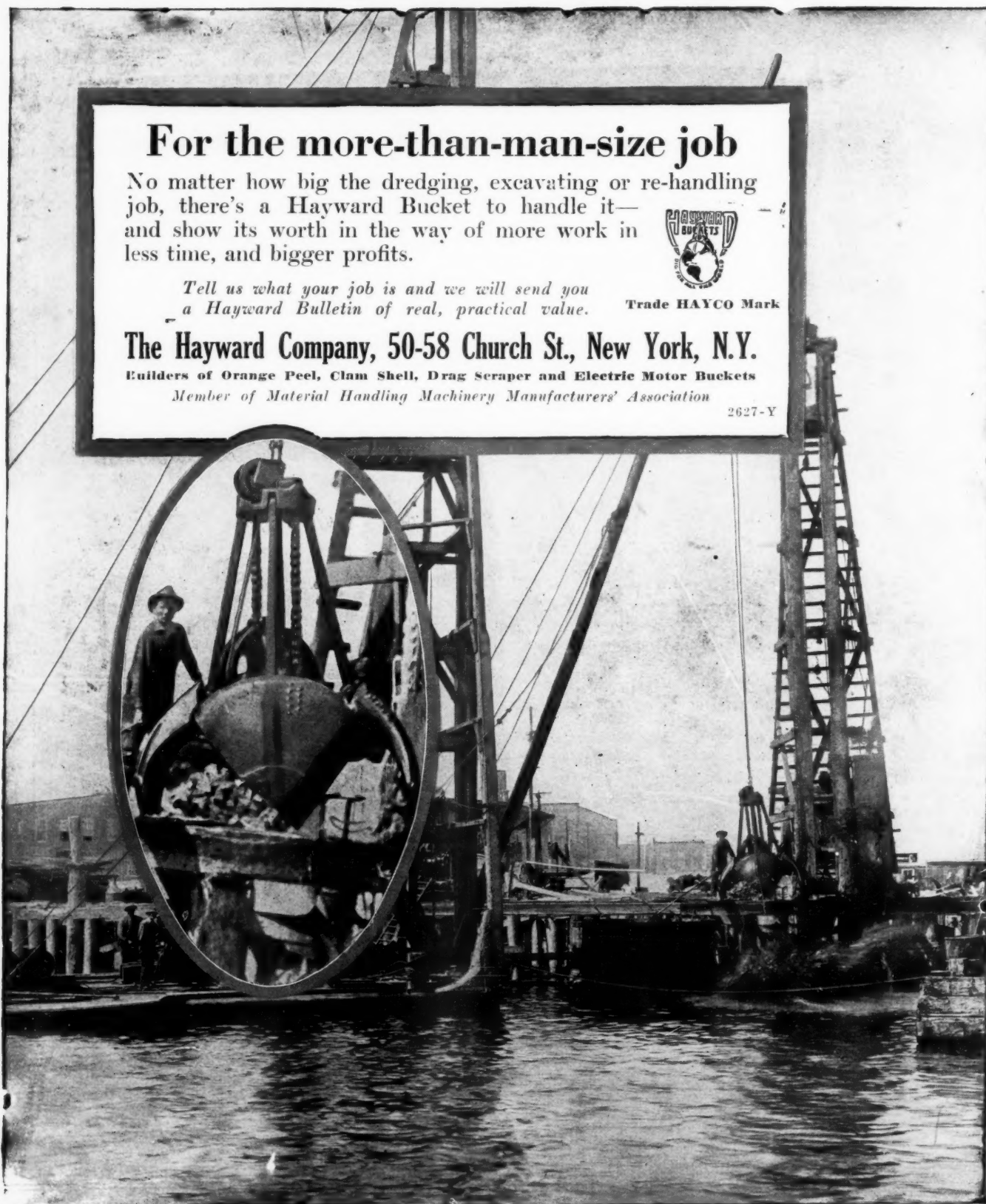
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Vol. 49

FLORAL PARK, AUGUST 7, 1920

No. 6

Devil's Gate Dam

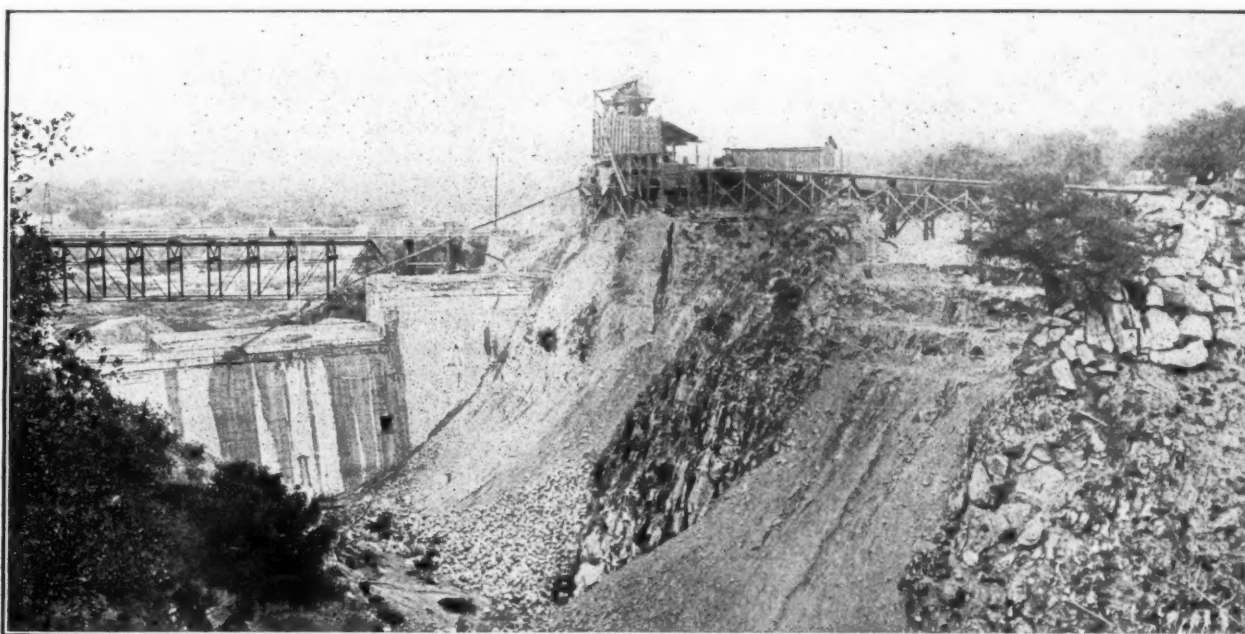
Flood control dam built for the Los Angeles County Flood Control District, with a maximum height of 130 feet, in the construction of which not more than twenty-one men were used, thanks to labor-saving machinery and methods.

There has recently been completed near Pasadena, California, a dam known as the Devil's Gate Dam across the Arroyo Seco which will create a reservoir covering about 200 acres. The quantity impounded is not large, but the purpose of the reservoir is not primarily that of storage but rather flood control. The channel of this stream can carry about 7,000 second feet without damage, but when the amount exceeds this there is danger of wash-outs and other injurious effects, and the floods in the stream sometimes reach 11,000 second feet. At such times the dam will hold back the peak flow of the flood, which is of short duration because of the steepness of the water courses and other topographical features of the country. The work is being done for the Los Angeles County Flood Control District, of which J. W. Reagan is chief engineer.

The dam is 310 feet long, its maximum height is about 130 feet, it is 2 feet thick at the top

and about 75 feet at the lowest point. In addition there are a driveway and two sidewalks across the top of the dam, which overhang the down-stream face of the dam and are supported by flying buttresses. Along the sidewalks are solid railings with lamp posts at intervals. This roadway carries traffic between Pasadena and Flint Ridge. The entire dam, buttresses, etc., contains about 35,000 cubic yards of concrete. In connection with the dam is a spillway about 100 feet wide and 250 feet long which is paved and walled with concrete. Also there is an outlet tunnel 500 feet long and 14 feet in diameter, driven through the solid rock and lined with reinforced concrete. This outlet is controlled by three 7-foot by 9-foot sluice gates which operate in a gate house. A view of the completed dam was shown on the front cover last week.

Solid rock for the foundation was reached without any deep excavation, being found not



DEVIL'S GATE DAM UNDER CONSTRUCTION. CONCRETE MIXING PLANT AT THE TOP CENTER

more than 15 feet below the stream bed. As a consequence, very little water was encountered in the foundation excavations. In doing the excavating, a large derrick with a 90-foot boom was used.

The entire construction is of concrete, the cement for which was furnished by the county. The aggregates were taken from the stream bed above the dam by steam shovel and were hauled by motor trucks up an inclined road and bridge to the mixing plant. This plant was built on the bank at one end of the dam and at such height that it was possible to pour eighty per cent of the concrete in the dam by chute directly from the mixer. The balance of the concrete was carried to place by means of concrete cars.

It will be seen that little hand work was required, the aggregate being loaded by the excavating shovels into trucks which carried it directly to the mixer, while the latter discharged it by chute directly into the dam. Under more common methods of construction work of this kind, a construction gang of about 75 men would have been employed. Owing to the labor-saving devices used by the contractors, Brent Bros. of Los Angeles, there were never more than 21 men on the job at any time.

In addition to the aggregate and the cement which was furnished by the county, about 200,000 lbs. of reinforced steel was used. The total cost of the dam will be something over \$200,000 in addition to the cost of the cement.

Some Small Imhoff Tanks

By W. A. Hardenbergh

Plans prepared by state health boards and others for sewage treatment plants for schools and institutions and small communities. Various retention periods and capacities per capita are recommended by different designs and for different sizes. The cost exceeds that of a septic tank, which may or may not be justified by better results.

Within the past three or four years generally, but particularly in North Carolina, where a state law requires that all houses within 300 yards of another residence shall be provided with a sanitary means of sewage or excreta disposal, the question of sewage treatment for homes, small communities, institutions, and the like has become an important matter. This is due as well to the great tendency of the past few years to instal running water wherever possible in homes, etc., as it is to the increased demand for sanitation.

This tendency produces the problem of providing a cheap method of sewage treatment which shall require no care or maintenance in operation, no skilled supervision, and no cost of upkeep. In a general way, the septic tank has done as well, perhaps, as could be expected, for there is no piece of complicated machinery that will run for any long time with no care, maintenance or supervision. The small septic tank has been used in such a variety of ways, installed so often by men entirely ignorant of its principles, and in places where its chances for proper operation were so small, that it is indeed wonderful that its reputation has survived at all. An article in Municipal Journal and Public Works some time ago pointed out the wide divergencies of

such authorities as State Boards of Health in relation to the capacity per person of these small tanks.

That near relative of the septic tank, the Imhoff, or two-story settling tank has, within the past few years, come into a great deal of well-merited favor in this country. It is very generally used, now a days, in large and even in fairly small installations, such as at the aviation fields during the war (these were all or nearly all circular installations) and at institutions. It is also being proposed for very much smaller installations, several of which are shown hereafter.

Without entering here into any argument as to the merits of the Imhoff tank over the septic in very small installments, it may be stated that the claims for the former are an effluent non-septic and free from odors, (through this is not a weak point with septic in the ordinary small installation), and a sludge, also free from odor, much easier to handle and useful as a fertilizer.

Essential elements of design of small Imhoff tanks as laid down by Frank in a recent publication of the U. S. Public Health Service (Bulletin No. 101) are: A mean detention period of not less than 4.5 hours, and sludge and scum

chamber capacities of not less than 3.5 and 2.5 cubic feet per capita respectively. The various state boards of health do not, as a rule, lay down very rigid specifications. In general, they are very liable to assume that the same principles, quantities and measurements may be followed as in the case of small septs.

Figure 1 shows an Imhoff tank designed by the Illinois State Board of Health to care for the wastes from a household of ten people. Owing to the uneven rate of flow in such small installations, the retention period advised is 5 to 6 hours or about three times the average for larger plants. This tank is one of the deeper of the small designs and calls for a depth of sewage of about 12 feet, while the tank itself is only 3 feet wide and four feet long, inside measurements. The total capacity of the tank is very nearly a thousand gallons, which is much larger than is generally regarded as required for a septic tank to handle the waste of ten people. The cost of this tank in 1916 was set at about \$60, which, of course, would not be applicable with 1920 prices.

Figure 2 shows a two-story tank designed by the Ohio State Board of Health, for use by ten people. On the basis of design, sludge will have to be removed about twice a year. This tank is slightly shallower than the tank shown in Figure 1, but slightly larger in perimeter, being 3 feet 8 inches wide and 4 feet 6 inches long.

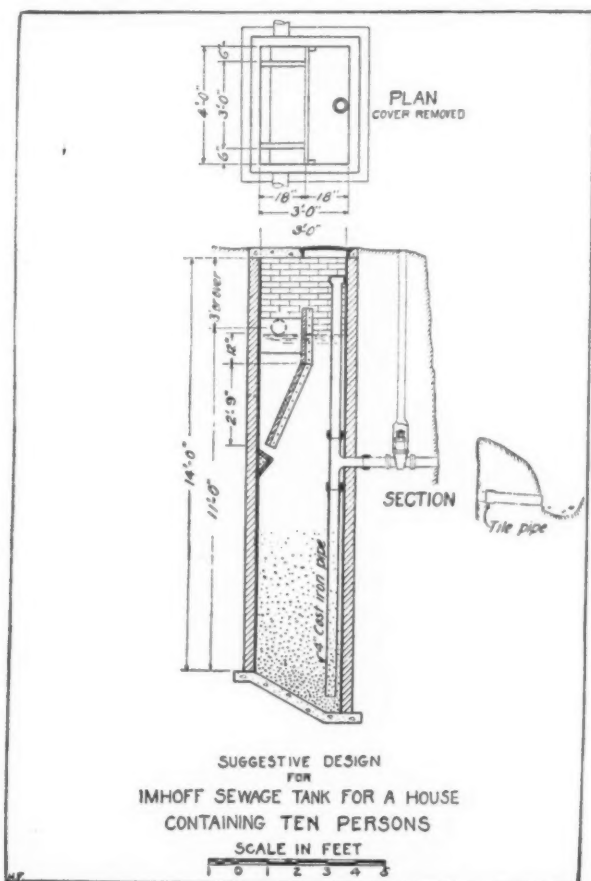


FIG. 1—"TANK ON PRINCIPLE OF EMSCHER TANK, SUITABLE FOR HOUSEHOLD OF TEN PERSONS"

The total depth is 10 feet 3 inches, but the effective depth of sewage is 9 feet 6 inches (average). The cubic capacity of this tank is over a thousand gallons, being somewhat larger than the Illinois tank first shown, as is the retention capacity also. The scum area is amply large, in the neighborhood of 45% of the tank area.

A tank designed by the State Board of Health of Wisconsin is shown in Fig 3. No measurements are given with this design, but the general requirements for tanks in that State are 30 gallons per capita.

The Ohio State Board of Health has also designed a tank for school use. This tank, shown in Figure 4, will care for 250 pupils, the basis of design being a flow of 15 gallons per capita per day. The flow may be passed through either or both chambers. The capacity of the channels is based upon a detention period of 4 hours (2 hours for each channel). The tank will care for 3,750 gallons per day, with total flow occurring

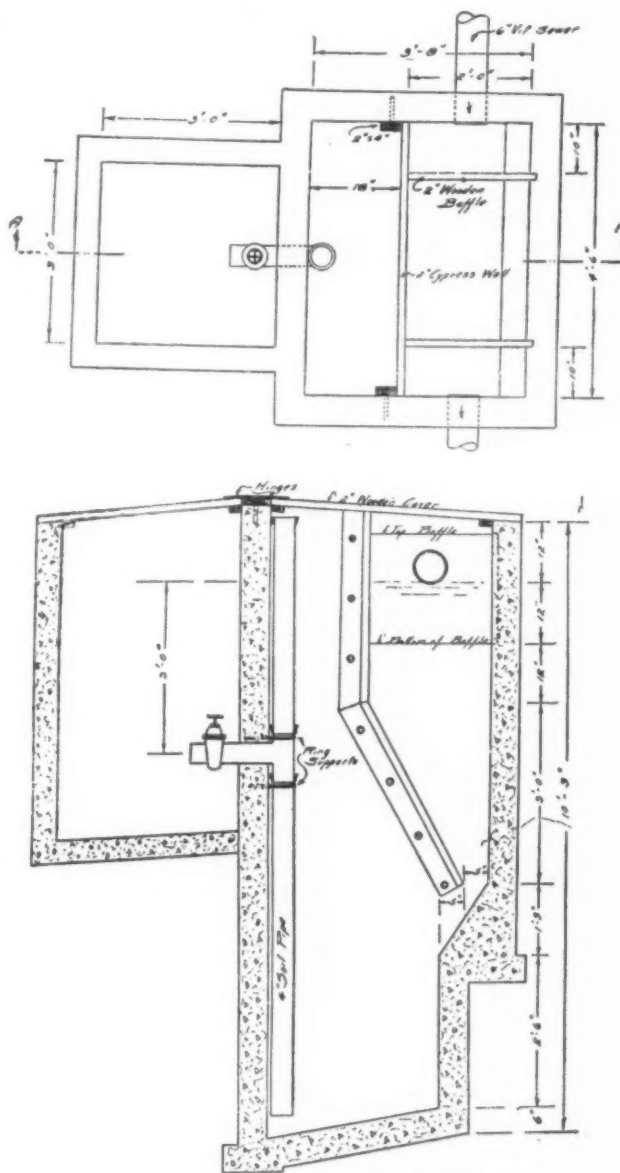


FIG. 2—FOR USE BY TEN PEOPLE
By Ohio State Board of Health.

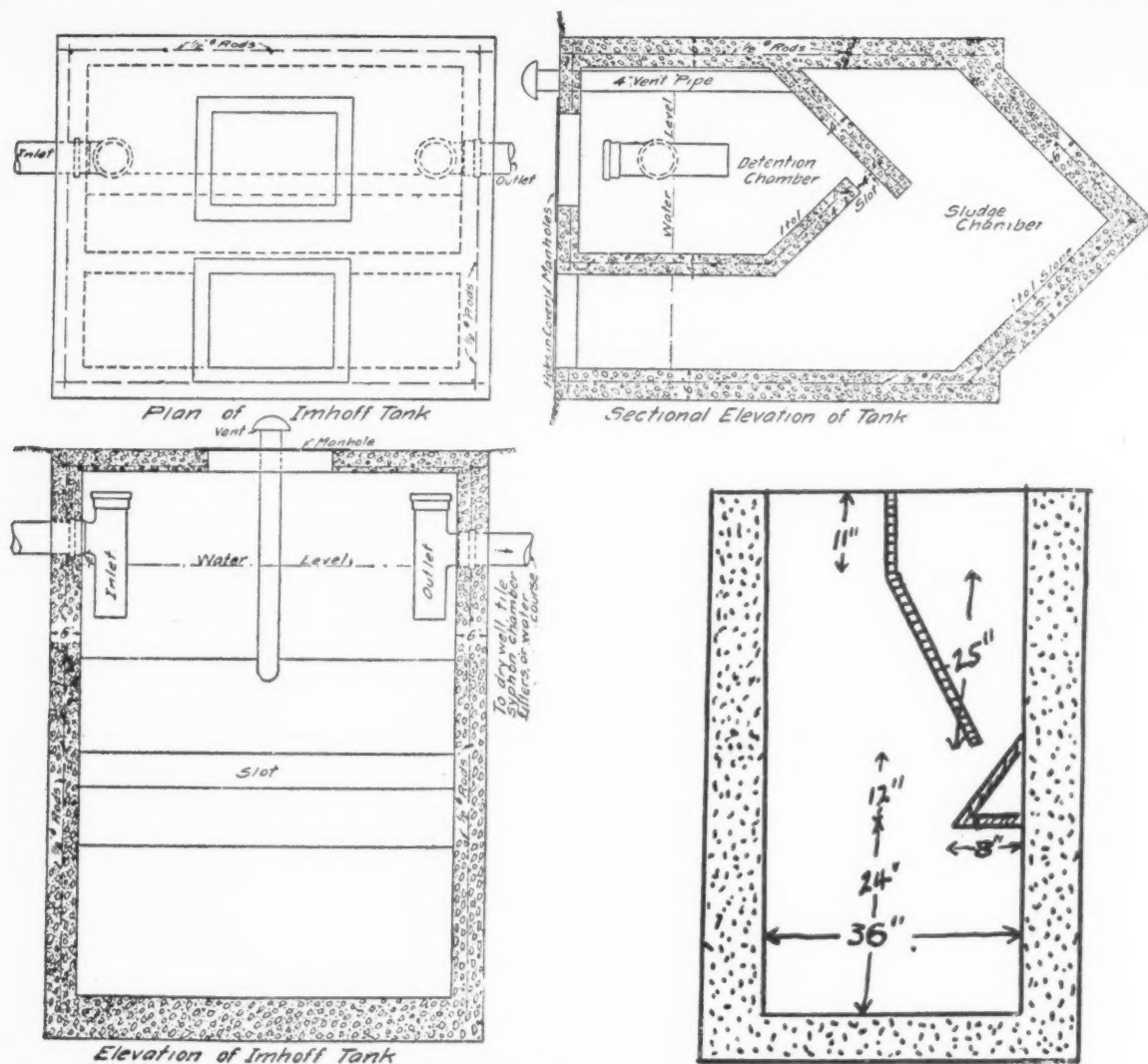


FIG. 3—DESIGN OF WISCONSIN STATE BOARD OF HEALTH

during the 8-hour school day. Slots and overlap are both 6 inches. The sludge compartment has a sewage capacity of 200 cubic feet, which is estimated to be sufficient for a 9 months accumulation of sludge. The gas vent has an area of about 17% of the tank surface. The depth, extremes, is 12 feet 4 inches. The cubic capacity of the tank is in the neighborhood of 5,000 gallons. As in nearly all the tanks described previously, a sludge discharge pipe is provided.

Frank Rhynus in the bulletin previously noted (U. S. P. I. B. No. 101), shows several designs for small Imhoff installations. The tank built to care for a family of five people with a total daily flow of 150 gallons of sewage, calls for a settling chamber capacity of 8 cubic feet, corresponding to a period of 9 to 10 hours, for a sludge chamber capacity of 5 cubic feet per capita, a scum chamber area of 1.2 square feet per person and a scum chamber volume of 3 cubic feet per capita.

The tank is the smallest of any heretofore shown and is 3 by 4 feet in plan and 6 feet deep, with a depth of sewage of 5 feet. Scum boards are placed 12 inches from each end. A section of the tank is shown in Fig. 5. This tank is combined with a dosing chamber and sand filter bed.

For a family of 6 persons using 320 gallons per day, the same tank is used but the secondary treatment is varied considerably. This tank has a working capacity of about 450 gallons, which is considerably in excess of the requirements of 5 people, as a rule, with the septic tank. Other designs are shown, worked out for various combinations and sizes, in the bulletin, which was prepared by Frank Rhynus under the direction of Prof. E. B. Phelps.

Figures 6, 7, and 8, show some designs for considerably larger installations. Figure 6, which has a depth of sewage of 9 feet 10 inches and a plan of 5 feet 6 inches by 8 feet at the top, 3 feet 6 inches in width at the bottom, was built to care for 150 houses in a mining community. This is a fairly cheap construction. The scum chamber area and volume are ample.

Figure 7 is a plain rectangular tank of more or less standard design. It is built to care for 300 people or 785 school children. The depth of sewage is 12 feet 6 inches and the tank is 11 feet square. In the original plan, no sludge discharge pipe is provided in this tank, but it can easily be added.

A somewhat peculiar arrangement is shown in

FIG. 5—FOR A FAMILY OF FIVE PERSONS

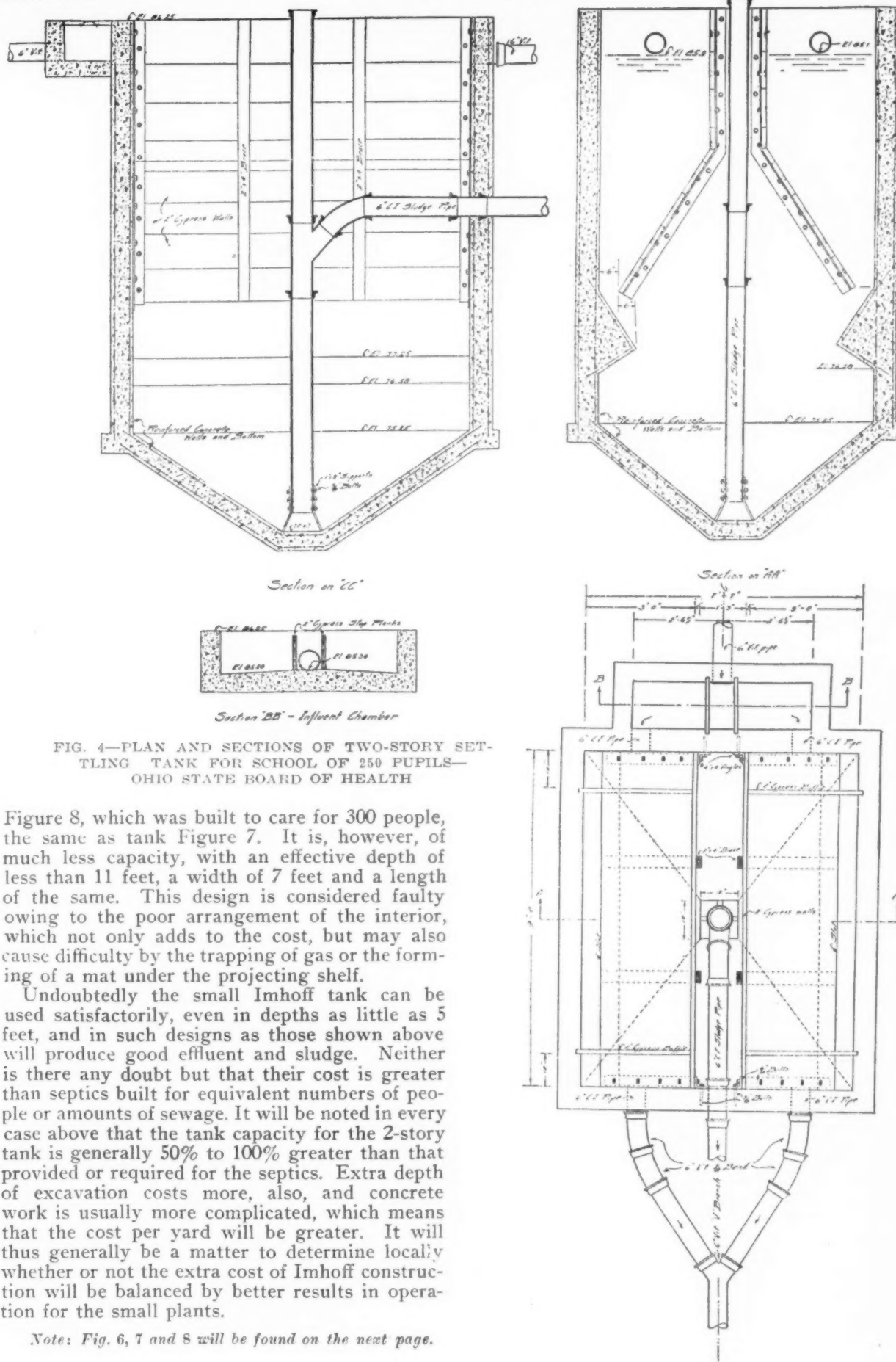


Figure 8, which was built to care for 300 people, the same as tank Figure 7. It is, however, of much less capacity, with an effective depth of less than 11 feet, a width of 7 feet and a length of the same. This design is considered faulty owing to the poor arrangement of the interior, which not only adds to the cost, but may also cause difficulty by the trapping of gas or the forming of a mat under the projecting shelf.

Undoubtedly the small Imhoff tank can be used satisfactorily, even in depths as little as 5 feet, and in such designs as those shown above will produce good effluent and sludge. Neither is there any doubt but that their cost is greater than septic built for equivalent numbers of people or amounts of sewage. It will be noted in every case above that the tank capacity for the 2-story tank is generally 50% to 100% greater than that provided or required for the septic. Extra depth of excavation costs more, also, and concrete work is usually more complicated, which means that the cost per yard will be greater. It will thus generally be a matter to determine locally whether or not the extra cost of Imhoff construction will be balanced by better results in operation for the small plants.

Note: Fig. 6, 7 and 8 will be found on the next page.

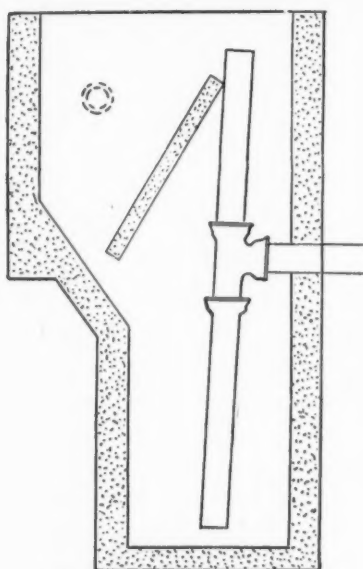


FIG. 6—DESIGNED FOR 150
HOUSES IN A MINING
COMMUNITY

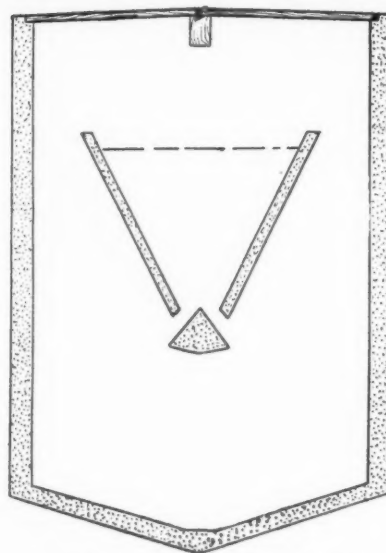


FIG. 7—DESIGNED FOR 300
PEOPLE, OR 785 SCHOOL
CHILDREN

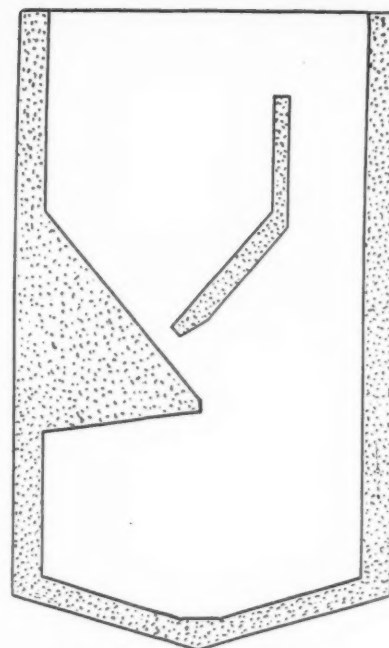


FIG. 8—FOR 300 PEOPLE

Heat Value of Toronto's Sewage Sludge

Investigations have been made by Toronto to determine the heating value of sludge accumulating at the sewage disposal plant, and these indicate that such value is nearly three times that of garbage. A fuel manufacturing company has contracted to purchase the city's garbage, paying \$1.00 a ton for the same, and it is hoped that similar arrangements may be made for disposing of the sludge if it is found to have a heat value warranting its use.

The tests are still under way but those so far made indicate that the sludge has an average heating value of 5,600 B. t. u.'s per pound, as against about 2,000 in the city's garbage. The constituents of the combustible material of the sludge average as follows: Fixed carbon 6.53%; volatile combustible matter 52.85%; ash 40.61%.

Sewer Contractors Abandon Contracts

Several contractors for the construction of sewers for the city of Detroit have abandoned their contracts recently, presumably because the cost of the work is greatly exceeding that which had been estimated by them. The city will hold the guarantee companies responsible for the completion of the contracts. One contract which was abandoned and which the guarantee company was notified to complete was renewed by the original contractor, the Commissioner of Public Works considering this to be to the advantage of the city since it would cost the department about \$450,000 to do work which had been let for \$276,300, and in addition a law suit would probably be necessary to collect the difference from the surety company.

Typhoid Fever in Dallas

During the past few weeks there has been an epidemic of typhoid fever in Dallas, Texas, but a considerable falling off in new cases was noticeable during the week ending July 17th. The health department, while it has not definitely determined the cause, reports that data so far obtained point to the water from White Rock reservoir. Owing to a break-down at the pumping station which supplies the water to the city regularly, water was turned into the mains from White Rock reservoir for three hours on June 10th without being filtered, although it was chlorinated with 0.4 parts of chlorine per million. The raw water tested 1,000 bacteria per c. c. and after being treated there were still 300 to 400 bacteria, while the city water usually carries only 15 to 30.

Philadelphia's Delaware Bridge Postponed

Although both the mayor and the councilmen of Philadelphia are reported to be in favor of the Delaware river bridge, for which Philadelphia would be expected to pay at least \$20,000,000, it seems certain that no definite action will be taken before the council adjourns for the summer.

As explanation of the delay, it is stated that the mayor is unwilling to add this heavy burden to the city taxes until he is satisfied that the population is in favor of it. In addition, he desires that more definite information concerning the plans and cost of the bridge be obtained and has asked the council to appropriate \$250,000 to be used by the bridge commission in obtaining the data necessary for determining these points more exactly.

Street Cleaning By Municipal Forces

Conclusions from a study of the subject made for the Philadelphia city council decidedly favor the employment of municipal forces for street cleaning and also for refuse collection. The argument for and against are given, and the recommendations.

"In the case of street cleaning work, the disadvantages of contract performance are so numerous and so overwhelming that the argument of possible increased labor efficiency under contract work is relatively unimportant. Municipal operation is the only proper method, and every effort must be made to overcome any disadvantages inherent to it."

This is the conclusion of a committee of three appointed by the city council of Philadelphia, stated in a report submitted to council July 13th. The committee consisted of Lieut.-Col. E. B. Morden, chief of the Bureau of Street Cleaning; James W. Follin, engineer of the Bureau of Municipal Research; and J. H. Nelson, principal assistant engineer of the Bureau of Highways.

In addition, Col. Morden and Mr. Follin recommended that rubbish and ashes be collected by city forces beginning, January 1, 1921, and Mr. Nelson that such service be postponed for one year longer, and all three agreed that municipal garbage collection should begin next year.

During their two months' study of the subject, the committee visited fifteen of the larger cities of the country and found that none of these clean their streets by contract. Until recently Philadelphia's charter required that city to do this work by contract but, as described in "Public Works" a few weeks ago, the charter adopted last year permits municipal street cleaning and collection.

The cities visited were New York, Chicago, Detroit, St. Louis, Pittsburgh, Toronto, Canada; Buffalo, Washington, D. C.; Newark, Baltimore, Rochester, N. Y.; Columbus, O.; Worcester, Mass.; New Bedford, Mass., and Trenton, N. J.

The reasons of the committee are summarized as follows:

"It is perfectly clear that no contract is on a sound basis unless, (1) the work to be performed is definitely specified so that the bidder can determine the cost of performance and bid intelligently, and (2) unless it is possible for the party paying for the work to determine if the work specified has been performed. With this statement in mind let us analyze the existing contracts in Philadelphia.

DISADVANTAGES OF EXISTING CONTRACT

"The existing contract for street cleaning is disadvantageous for the following reasons:

"First, It is humanly impossible completely

and definitely to specify the work to be performed, for although the frequency of cleaning can be given, standards of cleanliness are not possible of definition, and the results of the street cleaning must be judged without definite specifications, and therefore,

"Second, It is necessary for the bidder to pad the contract price to provide against possible unfriendly attitude on the part of the bureau chief who is the judge of the work performed, and of other officials.

"Third, The contractor is sometimes forced by unfavorable circumstances to attempt to control the city inspection forces, and there is an ever present temptation to influence their reports for a consideration.

"Fourth, Undue authority is given to the bureau chief to judge the results of the work performed, and he is in a position either to make or to break the contractor as he wills.

"Fifth, It is difficult to determine whether the streets are properly cleaned because of the intangible results, and the fact that the streets do not stay clean very long after the cleaners have been over them.

"Sixth, It is difficult to obtain practical and dependable inspectors.

"Seventh, The city is unwilling to pay salaries to the street cleaning inspectors commensurate with the responsibilities involved in work of such an intangible nature, thereby putting a premium upon inefficiency and dishonesty.

"Eighth, It is impossible to guarantee to the contractor that the public as a whole will obey ordinances, thereby throwing the burden of their disobedience on the contractor, who has this indeterminate factor to take into consideration in making his bid.

"Ninth, The contractor is tempted to slight the work by racing his equipment and speeding up his gangs, thereby covering the streets with the specified frequency, but only imperfectly.

"Tenth, It is impossible to obtain flexibility under any form of specifications to permit extensive modifications of performance such as are required by seasonal variations or emergency shifting of forces from one district to another.

"Eleventh, It is necessary for the bidder either to amortize his plant and equipment during the life of the contract, thus adding an excessive amount to the bid, or to insure by some other

means that the contract will be renewed and new competition discouraged.

"Twelfth. It is necessary for the contractor to add a high contingent cost to his bid to cover the greatest conceivable advances in the labor and material markets.

"Thirteenth. The cost is increased by dual supervision by contractor and the city.

The report points out that the new city charter, in providing for contracts for more than one year, overcomes the eleventh disadvantage of the present system mentioned.

"However, the other fundamental objections would not be altered by increasing contract term under the existing form of specifications, or even by including the minimum labor force requirements that were eliminated from the specifications two years ago.

ADVANTAGES AND DISADVANTAGES OF MUNICIPAL OPERATIONS

"Municipal operation of street cleaning work overcomes the majority of the objections to the existing contract performance listed above, but naturally has certain inherent disadvantages of its own. The advantages of municipal operation are as follows:

"First, Flexibility of organization, with ability to concentrate the force in emergencies and to revise methods and schedules to meet changing conditions that cannot be foreseen when contracts are let.

"Two. The placing of the city bureau organization on a business-like basis, actually performing the work, and abolishing the rewardless task of attempting to keep the contractor's work under control.

"Three. The substitution for the underpaid and unsatisfactory city street cleaning inspection force with superintendents and foremen who actually direct the work and get results, with actual economy from the abolition of costly dual inspection essential to contract work.

"Fourth. Actual saving of money to the city by eliminating the contingent fund included by the contractor in the bid price to guard against unfriendly or unreasonable action by the bureau chief in enforcing the specifications.

Fifth. Actual saving of money to the city in carrying its own insurance against advances in the labor and material markets for which the bidder may make more than the necessary provision.

"Sixth. Accomplishment of the maximum possible amount of work for the money appropriated by Council, since municipal work is at cost.

"Seventh. Avoidance of nonequitable contracts and possible expensive controversies in the courts.

"Eighth. Possible securing of better co-operation from the public in their care of the highways because of the sympathetic attitude of the public toward municipal work.

"Ninth. Opportunity for continuous study of conditions and for making beneficial changes in equipment and methods.

"Tenth. Direct and absolute control of the working forces.

"Municipal operation is subject to certain disadvantages which can be successfully overcome:

"First. The present inability to obtain experienced and properly qualified employees with dispatch through the Civil Service Commission.

"Second. The possible failure of the proper authorities to appreciate the need of sufficient funds to carry on the work and maintain the equipment, which might cause the service rendered to the public to be unsatisfactory.

"Third. Possible decreased efficiency of the labor because the foremen-supervisors are not actuated by the incentive of increased profits which exists in contract performance.

ADVANTAGES AND DISADVANTAGES OF CONTRACT WORK

"Contract work has certain inherent advantages:

"First. The contractor is able to purchase equipment and materials directly on the basis of practical judgment and without the competitive bidding in force in the city, thus saving delays and securing the most desirable equipment and materials.

"Second. The contractor is able to compensate supervising employees properly and to increase their salaries immediately to keep them from accepting more lucrative positions and, besides, can offer them special inducements.

"Third. The contractor can regulate wages and salaries without the complicated procedure required in municipal work.

"Fourth. The contractor can hire and discharge employees without restriction or regulation, such as civil service control.

"In the case of street-cleaning work, the disadvantages of contract performances are so numerous and so overwhelming that the argument of possible increased labor efficiency under contract work is relatively unimportant. Municipal operation is the only proper method, and every effort must be made to overcome any disadvantages inherent to it. Civil service control should be reasonable and not arbitrary; the city purchasing agent should cooperate to secure the most desirable equipment and materials and not merely the cheapest price, and the salaries of supervisors and foremen must be fixed equal to those prevalent in outside employment."

The report says that in the cities visited paving conditions were found to be "only fair," and that streets are not maintained as they should be.

"By comparison," the report continues, "the pavements in Philadelphia are probably in a less satisfactory condition than those in the majority of cities visited. Since good pavements are necessary in order to thoroughly clean the streets, the importance of putting the pavements in good repair cannot be overestimated."

GARBAGE DISPOSAL

Taking up the matter of the disposal of garbage, the report points out that a large number of cities are using pigs to consume this refuse. Hog feeding, according to the report, is the "most profitable of any of the methods of disposing of garbage if operated on a scientific basis with proper co-operation from the garbage collection

service." The report states that health officers and residents near to piggeries sometimes object, but these objections, according to the experts, are often groundless. Piggeries properly kept do not become a nuisance.

All officials interviewed by the experts laid stress on the necessity of proper legislation requiring the public to place refuse in proper receptacles and preventing the littering of the streets. In several cities district superintendents are made special policemen with power to arrest. In others a number of regular patrolmen are assigned to this work.

RECOMMENDATIONS MADE

The recommendations made were:

"First. That street cleaning in the entire city be conducted by municipal forces in the year 1921.

"Second. That ashes and rubbish be collected by municipal forces in the year 1921.

"Third. That garbage collection be conducted by municipal forces in 1921, provided that proper bids can be obtained for the disposal of garbage as separate from its collection.

"Fourth. That bids be asked before August 1 for the disposal of garbage from each of the nine street cleaning districts, on alternate bases of one and five year contracts at a ton price rate, the contractor to bid on one or more districts, and to specify the method of disposal to be used and the points where the garbage will be received, the city reserving the right to award one or more contracts for disposal in accordance with the most advantageous plan to the city as a whole.

"Fifth. That rubbish be disposed of according to the present method until steps can be taken toward the erection of utilization plants, to be operated on either contract or municipal basis as may then be found most advantageous.

"Sixth. That immediate steps be taken to determine the practicability and costs of the purchase of the existing plants and equipment used by the present contractors, or of such other plants and equipment as might be available, and also the basis upon which such plants and equipment can be leased if purchase is inadvisable.

"Seventh. That provision be made at once for the expansion of the organization of the Bureau of Street Cleaning to include adequate engineering personnel to study continuously and to plan improvements in methods of doing work, and such other personnel as is requisite to carry on an intensive continuous educational and law-enforcement campaign.

"Eighth. And, finally, that the 1921 State Legislature be requested to enact new legislation to re-enforce and improve existing laws which regulate the littering of the streets and require the placing of refuse in specified types of receptacles."

Thousand-Foot Piers for Weehawken

The Cunard Steamship Company plans to construct one of the largest shipping terminals in the world on the Weehawken water-front at the cost of approximately \$40,000,000 and has asked the approval of the New Jersey State Board of

Commerce and Navigation. The company has acquired the rights conveyed to the Delaware and Hudson Canal Company by New Jersey in 1879 and the conversion of this lease into a grant in 1886. The company owns about 4,000 feet of shore front, between the West Shore Railroad on the north and the Erie Terminal on the south. Its plans include the construction of eight 1,000-foot piers.

Traffic Tunnel for Duluth

The City Commission of Duluth is considering the construction of a tunnel from the main land under the canal to the Park Point for handling passenger, vehicle, street railway and freight railway traffic. Such a tunnel has been advocated for many years, but with the rapidly increasing traffic over the aerial bridge the time seems rapidly approaching when the tunnel will be a necessity. While no definite plans have been made, it is suggested that it be a duplicate tunnel with sufficient capacity to handle the various kinds of traffic above named.

The aerial bridge across the canal was built in 1904 and was not intended for the heavy traffic which now uses it. Its original cost was \$100,000 and during the 14 years of its existence, maintenance alone has totaled \$178,000, that for last year having been \$15,000. It was originally intended to permit traffic across the bridge at intervals of 20 minutes during rush hours and 30 minutes at other times, but the interval has had to be shortened and the bridge is no longer capable of handling all the traffic which wishes to use it.

Bus Lines or Street Railways

Street railway companies in several eastern cities are threatening to stop service and surrender franchises if motor buses are allowed to operate on streets used by them. One has actually done so.

The use of motor buses as public conveyances in city and interurban traffic has increased greatly during the past two years, and this increase has naturally aroused the antagonism of the street railways where it has been in direct competition with them.

In a recent discussion of the subject John H. Pardee, president of the American Electric Railways Association, states: "Those cities in which unrestricted jitney competition is now permitted must, in my opinion, soon make a similar choice (between street railways and jitneys.) I do not believe the electric railway can hamper the development of the motor vehicle. I do not believe that it should do so if it could. I do believe, however, that the motor vehicle has no greater rights than the electric car and that it should not, and ultimately will not, on its part be permitted to interfere with electric railway development."

As furnishing a tentative solution of the transportation problem for newly grown suburbs or other sections of the city where the traffic does not yet warrant the great expense of road bed and trolley cars, there probably will be few to question the service rendered by buses, whether regular 20 to 40 passenger bus built for this purpose or the touring jitney. The question is, whether cities should permit such vehicles to compete directly with street railways by paralleling their routes. There is undoubtedly considerable truth in the claim of the railways that such competition may reach the point where it will render operation of the railways unprofitable and that the latter will therefore go out of business, leaving the entire traffic to be handled by the buses. Cities should therefore consider carefully whether the bus service would be as satisfactory to them as the present street railway service, and if not, whether they should not cooperate with the street railways in preventing the competition which will ultimately eliminate them.

The buses operate under the great advantage that they are not required to spend enormous sums for construction and maintaining road bed, and the further advantage that they can change all or any part of their route at any time without any financial loss. Not only are they relieved of the cost of constructing an expensive road bed, but they use, without any cost to themselves except a fee which is generally ridiculously inadequate, the city pavements which are paid for by the taxpayers but which they do an appreciable amount toward destroying.

In the northern part of New Jersey, in New York's metropolitan district, motor buses and jitneys are found by the thousands, and, as noted in Public Works a few weeks ago, the Public Service Corporation, which operates the trolley lines through this section, has appealed to the courts to prevent the competition of these buses.

The subject is being considered by city officials of Toronto, and the Bureau of Municipal Research of that city has endeavored to obtain some information concerning the operation of motor buses in American cities. It obtained information from Chicago, New York, Detroit, Los Angeles and nine other cities in different parts of the country which have had such buses in operation for from thirteen days in the case of Detroit to thirteen years in the case of New York, most of them from two to six years. These charge a five-cent fare in Akron, Huntington, Houston, Kansas City, Los Angeles, San Francisco and Toledo, and 10 cents in Chicago, Detroit, New York and part of Kansas City. In Los Angeles the fares run up as high as 20 cents and as low 3 cents. The capacities of the buses vary from 5 in Houston to 48 in Detroit, the latter being double decked.

The Bureau could obtain only a few figures on operating cost. In San Francisco the operating cost is reported as 23.6 cents per bus mile, while the return on a 5-cent fare yields only a little over half this. In Akron the buses are operated by the Goodyear Company without any intention of making any profit and charge a 5-cent fare for a run of from one to three miles, while the cost is found to be about 4 1-6 cents per passenger.

Striking Trolley Companies

A number of street railway companies have recently been enforcing their demands for permission to charge higher rates of fare by assertions that if such privilege be not granted to them they will discontinue operation altogether, since their income will not permit continuance of service. The demands of a number of companies have become more insistent with the recent rapid growth of jitney service in the East, and several companies have threatened that unless the municipal authorities prevent direct competition with their lines by jitneys or motor buses, they will discontinue service.

Among these was the Connecticut Company of Bridgeport, Conn. Such plea having been made by it, the matter was investigated by the Bridgeport Chamber of Commerce, and a general meeting of the chamber was held on July 12, when every member was given an opportunity to speak or to question any other speaker, the only limit being one of time. The president of the railway company and the president of the Bus Owners Association presented their sides of the question and the discussion was opened by Walter S. Jackson, a street transportation engineer, who had spent several weeks in Bridgeport making a survey of the problem.

Following this meeting, a referendum form was mailed to the members of the Chamber of Commerce and they voted overwhelmingly for limiting jitney and motor bus competition to streets not served by trolley lines. This is interpreted to mean that the majority of the merchants of the city believe that "the trolley furnishes the best available means for adequate, regular, responsible and regulated street transportation," and that jitney service should be confined to streets not served by trolleys.

In spite of this action, the immediate competition of jitneys with trolley lines was allowed to continue, and about ten days after the meeting the trolley company discontinued service, thus giving the motor bus owners an opportunity to demonstrate whether or not they can meet all of the rapid transit requirements of the city. At this writing the trolleys are still out of service and the bus companies have greatly increased the number of buses in service. It is too early yet to decide to what extent the buses can meet the traffic requirements of the city, until both they and the travelling public have become accustomed to new conditions.

Municipal Water Supply for Huntington

A citizens Association of Huntington, L. I., known as the Huntington Association, is considering the construction of a municipal water supply system to include not only Huntington but also Cold Spring Harbor and possibly other communities, to form a water district.

The Huntington Water Works Company is now operating under a thirty-year franchise which expires next January. The proposed district would comprise a territory having about 11,000 population and an assessed valuation of \$10,000,000.

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Imhoff Tanks for Institutions

The number of sewage treatment plants installed in connection with small communities and institutions is increasing and is likely to continue to do so. In several of the states such plants are required to be constructed for school houses where these are not along the line of a sewer, while state and country institutions which are not located in sewered cities are provided with these methods of disposing of their sewage. Such plants are affected by conditions peculiarly their own and these should be kept in mind when designing them. In the case of large institutions there is ordinarily a superintendent who will have charge of the plant and who presumably is more intelligent than the men generally placed in charge of similar plants in small cities and villages, and the desirability of making the plants almost automatic and fool proof is therefore not so great. In the case of country schools, however, it may be that the plant receives practically no attention except occasional visits by inspectors of the State Board of Health.

On another page of this issue a number of plans for tanks to be used for schools and institutions are shown and discussed by an engineer who formerly was connected with the U. S. Public Health Service, these being all of the two-story or Imhoff type of tank. Experience with the operation of these tanks in cities of moderate size and under intelligent supervision has shown that if they are to operate successfully they must be watched carefully and considerable intelligence and experience drawn upon by the operator if foaming and other troubles are to be avoided. It would therefore seem to us that this type of tank is not well adapted to country schools although it may give good service in an institution where it is under the immediate observation of a superintendent who is interested in having it rendering good service. Even an interested superintendent, however, may find it beyond his ability to prevent or correct the various difficulties of operation which may arise.

The author of the article referred to states that he has found the well known septic tank to be operating with success under conditions which would seem to offer every opportunity for failure,

and this type of tank would appear to be as nearly fool proof as any sewage treatment device could be expected to be. It would therefore seem that he would be warranted in holding the opinion which he seems to imply that he entertains, that the septic tank should be used in preference to the Imhoff tank for these small installations unless where a careful study of all the conditions indicates that the results by the Imhoff tank are to be preferred to those securable from the septic tank in spite of these objections. He finds that, if operated with reasonable care, there is no considerable odor from either of them, and the most prominent feature commending the Imhoff tank is the greater adaptability of the sludge to use as a fertilizer, while the most serious arguments against it would appear to be its greater cost and the more expert operation required.

Freight Rates and Road Construction

The construction season for highways is just about half over, and from almost all sections of the country the report comes that the anticipated amount of construction has been reduced by 50 to 75 per cent by the inability of the contractors to obtain materials, chiefly because of the inability of the railroads to transport them. It is true that certain materials such as cement cannot be furnished by the manufacturers in the quantities desired and many contractors have been held up for weeks at a time because of this rather than failure of the railroads to deliver it; but it is probable that, were the mills able to provide it as rapidly as it was desired, it would be found that the lack of railroad transportation facilities would interfere to limit the deliveries.

Freight rates are higher than in previous years and this of course adds to the cost of the materials delivered on the job, but little is said about this. The question arises whether the increase in freight rates which was authorized a few days ago, amounting to from 20 to 40 per cent in different classes of material, will have any effect upon the material situation in connection with road construction. Considering that the high rates already existing do not appear to have retarded construction at all, and that, of the three elements of labor, material and funds required for road construction, the last is the only one which has not given concern in a great majority of cases, it does not seem probable that the increase in freight rates will materially affect the highway situation, at least until the problems of labor and production of material have been solved.

The purpose of the increase is to permit the railroads to add to and improve their equipment so that they may be able to handle the freight which is now practically under embargo, but it will be impossible for such improvement to show any effect before the next construction season begins. Consequently highway officials and contractors will not expect to notice any improvement this year in the material transportation situation; unless, as has been suspected by some, the railroads have so handled the situation as to

make it appear much worse than it need have been and, now that they have obtained their purpose of securing an increase in rates, will make a more honest and determined effort to relieve the transportation situation.

It is to be hoped that, either because of this or consequent upon the relieving of the coal shortage in the northwest and northeast, more cars now used for hauling coal will soon be available for transporting stone, gravel, cement, asphalt and other road construction materials, and the rate of highway construction during the next three or four months may be increased considerably over that which could be obtained during the first half of the construction season; and that next year this one of the problems facing all those concerned in highway construction will have been removed or largely ameliorated. This will leave, as factors deciding the amount of work which can be done, the amount of labor and of material available; and the indications are that by winter the situation in connection with both of these also will have improved considerably.

Improved Method for Difficult Pile Driving

In the installation of piles, both for foundations and for sheeting, two important, and often very difficult and costly essentials are driving through hard or obstructed materials and the completion of the installation without injury to the piles.

Where hard impact driving is required, all types of piles are liable to injury, sometimes too great to permit their installation by ordinary methods. Precast concrete piles of the usual design are not generally considered suitable for prolonged heavy driving and are especially liable to be seriously damaged or destroyed by such operations carried on in the usual manner, and when those or other kinds of piles are driven to refusal under adverse conditions there is likely to be warranted distrust of their integrity, even if the visible portions are apparently not seriously damaged.

These difficulties and uncertainties can sometimes be largely eliminated by the design and method used in the demonstration described in this issue, — where a rational principle, not commonly applied in such work, was found very successful with precast concrete piles. These instead of being subjected to severe impact, compression, column stresses and possible eccentric or bending stresses and injury by mashing the pile top, were pulled down after the pilot shoe and relieved of practically all installation stresses except tension, which they were specially designed to resist.

The new features would seem to be capable of wide development and modification, and applicable to concrete, wood and steel piles of many kinds and any dimensions, and are pertinent to a wide range of important construction work.

Rates for Electric Power in Eugene, Ore.

The general superintendent of the Water Board of Eugene, Oregon, in a letter dated July 27th

calls our attention to the fact that, in the table of "Prices in 1914 and now" in the June 12th issue, the rate for electric current for power in Eugene is given as 9 cents per kw. h. instead of 0.9, which it should have been. We are sorry that this typographical error was not detected, and make this correction at the earliest possible date.

Cleaning Philadelphia's Streets

On another page of this issue we give an abstract of the report of a committee of engineers appointed to study the subject of municipal vs. contract cleaning of streets and collecting of refuse in Philadelphia. Those in favor of municipal cleaning are considerably exercised by the fact that the mayor and council appear to be making no effort to prepare for taking over the street cleaning by the first of next year, although it is admitted by all that to do so will involve a very considerable amount of preparation. In fact, the mayor appears to be hesitating for the very reason that he questions the ability of the city to undertake the work on only five months' notice. The Bureau of Municipal Research of the city, under date of July 29, publishes a protest against the delay. After calling attention to the requirements of the new charter that the mayor inaugurate street cleaning by January 1, 1921, unless contract operation be authorized by a vote of eleven councilmen and the approval of the mayor, and that therefore, unless both mayor and council take such action, municipal cleaning will automatically become the only legal method at the end of this year, the bulletin of the Bureau concludes as follows:

"Certain definite things are essential to starting municipal street cleaning in 1921: Plant and equipment, a labor organization, an administrative or directing bureau staff and adequate operating funds. Plant and equipment involve a capital outlay which cannot be made available from a popular loan at the November election in time to be of use, but the amount necessary however lies within the remaining borrowing capacity of council.

"The development of a labor organization will present many difficulties, it is true, and while future conditions may be uncertain, the city can much better afford to take a chance on adverse labor conditions than can the individual contractors who will charge the city for the chance which they must take.

"Reorganization of the street cleaning bureau is necessary to provide engineering personnel, supervisors and foremen to handle the labor force, but this change will not increase the office payroll because the present inspectors will be no longer needed.

"Operating funds in the 1921 budget probably will not exceed the 1920 appropriations unless labor and material prices increase, but in this event contract prices would also be higher for 1921. After all, the citizens are ready to go the limit of expense if clean streets can be obtained by municipal work."

Road Improvements in Burlington County New Jersey

Converting 60 miles of macadam to sheet asphalt surface. Original width increased and new shoulders built. Binder and top courses mixed at contractor's central plant and hauled maximum distance of 10 miles.

Burlington county, in the west central part of New Jersey, is about 25 miles wide and 60 miles long, reaching to the Delaware river. The soil is in general sandy and loamy, well cultivated, with flat and rolling surface. There is in the county a total of about 1,000 miles of dirt roads and 250 miles of improved roads.

About 60 miles of the macadam roads are being converted to sheet asphalt surface, of which 20 miles was contracted for and completed during last year at a cost of \$20,000 per mile, and 20 miles more are being laid during the present season at a cost of about \$30,000 per mile, and it is planned to lay the remaining 20 miles during next season.

This year the unit price for top course is about \$1.65 per square yard, and widening and resurfacing the foundation, \$1.35. In most cases the top course is laid directly on the top of the old waterbound macadam after the latter has been carefully prepared.

In a few cases where the land is very flat and low and the drainage is difficult, the macadam foundation has been replaced by a few thousand feet of concrete base in which, where there is a trolley track, patent angle-iron paving guards are laid on both sides of the track and give excellent satisfaction.

MOORESTOWN—MT. HOLLY ROAD

The road from Moorestown to Mt. Holly, 36,950 feet long, has a 66-foot right of way, and has a paved width of 18 feet with a foundation from 6 to 14 inches thick and a new surface 3 inches thick.

The work is being done according to the designs of and under the supervision of James Logan, engineer of Burlington county. The contract is being executed by the Union Paving Company, of Philadelphia, and includes furnishing 11,193 tons of broken stone and furnishing and placing 75,000 square yards of sheet asphalt surface, besides incidental work, at a total contract price of \$160,000.

The original macadam surface being only 12 to 14 feet wide, it required an extension of 3 to 2 feet on each side, which was made by digging trenches 6 inches below the finished grade of the road, rolling or compacting the bottom of the trench when necessary, and depositing thereon 2½ inch broken stone, rolling it and covering with binder.

The macadam surface is scarified from 2 to 3

inches deep by a steam pressure scarifier attached to the road roller, and the loosened surface is harrowed until all the stone has been cleaned. All depressions are filled with 1½-inch broken stone and the surface is crowned by hand-work or by a road grader, and rolled to a solid uniform surface.

A 1½ to 4-inch layer of 1½-inch broken stone is carefully spread and thoroughly rolled with a 10-ton three-wheel roller, is then covered with local gravel and a top dressing of stone screenings in equal parts, sprinkled and rolled to a hard, smooth, uniform surface under a uniform pressure of not less than 400 pounds per lineal inch of roller. The rolling is done from beyond the side lines transversely to the center of the road. A shoulder 6 feet wide is built of material excavated from the trenches, and thoroughly rolled, and the full width from gutter to gutter is scraped.

The contractor usually had work in progress on two or three sections of the road simultaneously, at each of which traffic was diverted for a length of 2,000 to 3,000 feet. In each section there were at all times short lengths of road in every condition, from the scarified macadam to the finished surface nearly ready for traffic.

After a given length, usually about 1,000 feet, of road had been widened and resurfaced as already rescribed, it was opened to traffic for at least one month, to wear down the fine material on the surface and expose the larger stone. It was then swept with machines and by hand with splint brooms, and all depressions filled with 1½-inch stone bonded into position by thorough rolling.

On the well-cleaned surface there was spread a binder course applied at a temperature of 240 to 325 degrees F., according to the temperature of the atmosphere and the condition of the binder. The binder was spread with hot shovels, raked, and rolled to a thickness of 1½ inches with a smooth and regular surface parallel to the finished surface of the pavement. The rapidity of rolling was limited by the specifications to 150 square yards per hour for each 10-ton roller.

As soon as possible after the completion of the binder course, the top course was deposited on it at a temperature of 230 to 350 degrees, according to atmospheric conditions and character of materials, and was shoveled, raked and rolled like the binder, a strip 12 inches wide adjacent to each curb being covered with hot



ROLLING BINDER COURSE



BINDER COURSE

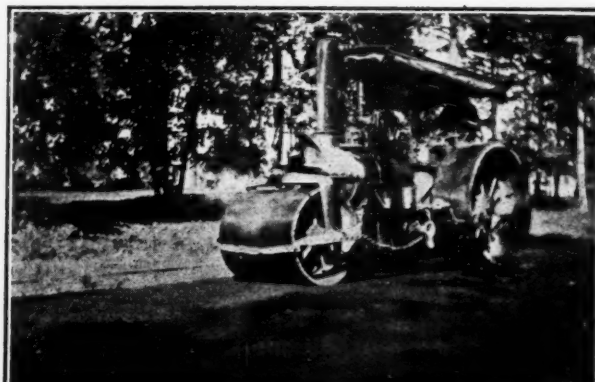


DUMPING HOT ASPHALT



RAKING HOT ASPHALT

BUILDING IMPROVED SURFACE ON OLD
FOUNDATION



ROLLING TOP COURSE



SMOOTHING TOP COURSE



SWEEPING CEMENT ON ASPHALT SURFACE

FINISHING THE WEARING SURFACE

asphalt cement and ironed with hot smoothing irons when required.

With a total force, exclusive of the men employed at the central asphalt plant, of about twenty men, the work was executed at an average rate of about 1,800 square yards of finished pavement per working day.

RIVER ROAD

The river road at Riverton, N. J., is being resurfaced for a width of 28 feet and a length of about 6 miles, replacing an oiled surface macadam road 18 feet wide, the extra 10 feet in width of the new road being paid for by the borough, while the county pays for the standard 18 feet of width. In general the work is being executed by the Union Paving Co. as contractor

in the same manner as the Mt. Holly Moorestown Road.

The surface is first loosened to the depth of the oil treatment by a scarifier, the waste material is removed by a scraper also drawn by the roller, and the road is again scarified, harrowed, scraped, and crowned 4 inches with a layer of 2½-inch stone covered with gravel binder and rolled. A 1-inch layer of screenings is spread over the surface, puddled and rolled until solid, after which the road is opened to traffic for 30 days and the binder and top courses applied in the standard manner.

The binder and top course are hauled 10 miles from the central mixing plant and the top course is, in this case, made so stiff with stone dust that it has developed a tendency to stick in the truck's body, making it difficult to dump it. It was, therefore often necessary to repeatedly back the truck violently against a bumping log in order to jar the asphaltic material out and distribute it over about 50 linear feet of road for each truck load.

MAINTENANCE

These two examples illustrate the general method of resurfacing the Burlington county roads, all of which is done by contract. The maintenance is done by the county forces, which operate three repair units, each consisting of a 1½-ton Ford truck chassis with a 2½-ton steel dump body, used for hauling broken stone, binder and top course required for patching and repairs, as well as for the maintenance of surface-treated and macadam roads. These trucks, which cost only \$1,180, can be run at a speed of 20 miles and do as much or more work as effectively as the \$6,500 5-ton trucks that run much more slowly. The binder and top-course material is purchased by the county from the contractor's central plant, where it is delivered to the county trucks at a price of \$8.50 per ton—considerably cheaper than it could be mixed by the county.

Road stone is broken in crushers, transported by rail and unloaded by a Byers auto-crane to portable storage bins, from which it is loaded by gravity to trucks and wagons for distribution for maintenance work and for the construction of road shoulders.

The county maintains a 600-gallon tank on an auto chassis, with pressure equipment for applying liquid asphalt for the surface treatment of macadam roads. It is planned to provide, next winter, units of Champion snow plows and trucks sufficient to remove, within 24 hours after it falls, all snow from a width of 18 feet on the 60 miles of asphalt-surface roads in the county.

Detecting Overloaded Trucks

The Automobile Division of the Pennsylvania State Highway Department has furnished its inspectors with lodometers or jack scales for detecting and obtaining evidence against automobile trucks that are carrying overloads on their machines. The lodometer is a mechanism with a jack attachment which is placed under the axle of a truck suspected of being overweight. Two lodometers are placed under an axle and

jacked up and the dials on the lodometer give the weight carried by each, the sum of two being the total weight on that axle. The weight on the other axle is then determined in the same way.

Under the state law, trucks must have painted on the outside the maximum weight limit permitted by the manufacturer of the car. If the lodometer indicates that this weight limit is exceeded, the inspector takes the truck to the nearest scales where the weight is checked up.

The inspectors find that there are many violations of this law after dark, there being a steady stream of heavy motor trucks plying constantly day and night between Philadelphia and points in New Jersey and New York. The fine for overloading a truck is from \$25 to \$100 and costs, or six months in jail. The fine goes into the treasury of the municipality in which the arrest is made.

War Department Favors National Highways

As a result of the trip made by the seventy-three army trucks from Washington to the Pacific coast last summer, the War Department reported on July 18th to the Highway Committee of Congress its conclusion that there was need for a comprehensive system of national highways, the recommendations of the department being as follows:

"First—That the necessity for a comprehensive system of national highways including transcontinental or through routes east and west and north and south, is real and urgent, as a commercial asset to further colonize and develop the sparsely settled sections of the country, and finally as a defensive military necessity.

"Second—That the existing roads and bridges especially in the sparsely settled sections of the middle and far western states, are absolutely incapable of meeting the present day traffic requirements, and until modern types of roads and bridges are constructed which will permit the rapid movement of heavy motor cargo vehicles during any season of the year and in all conditions of weather, economical transcontinental highway traffic will continue to be but a vain hope.

"Third—That the road problem of the middle and far western states are national rather than local problems, as these states, while possessing vast area and tremendous mileage of highways, have only a sparse population which cannot possibly undertake the needed highway improvement work, which more over is usually of greater importance to the country as a whole than to the individual states.

"Fourth—That the radius of action and resulting utility value of the motor vehicle is limited only by the condition of the roads, and that the provision of adequate roads will have a far reaching effect on the economic development of the country at large.

"Fifth—That the types of motor vehicles, especially those used by the army, should be coordinated with the road conditions. In other

words, until such time as all sections of the country are connected by improved highways that are passable to heavy motor vehicle traffic at all seasons of the year, the size and weight of vehicles should be limited to types of light and medium capacities."

A New Method of Driving Piles

Precast foundation piles uninjured by very severe driving with double acting steam hammer to penetration of 33 feet through fill, stiff clay and sand to a refusal of 565 blows per inch although resistance caused piles to fracture in tension when pulled.

Severe driving is often necessary when piles are installed in very hard ground or encountering obstacles in softer ground. When, as is sometimes the case, it is necessary to strike thousands of blows on the pile head with a two-ton or three-ton hammer there is danger of injuring or destroying the pile, especially if it is of concrete.

The improved method, here described, of relieving the pile of compression and battering from tremendous hammering, and actually pulling it down instead of pushing it, enables it to endure excessive punishment without injury and to be driven under conditions too severe, and to depths too great for ordinary practice. Besides removing one of the principal objections to the use of precast concrete piles in many places when they are most desirable, this method is applicable to most all other kinds of piles, and its development is of interest and value for a good deal of substructure and permanent and temporary construction work.

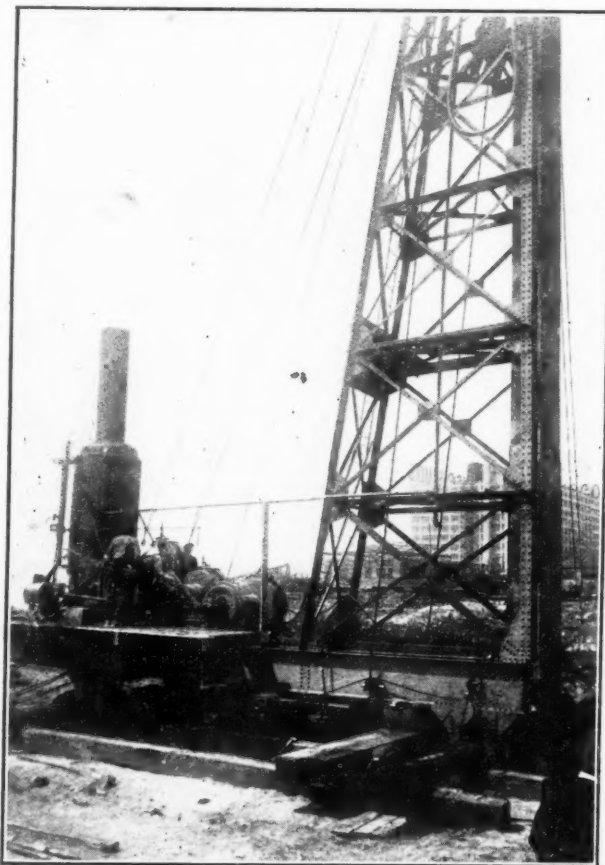
Parties interested in the design, construction and promotion of such piles gave a demonstration of the driving of them by this method on May 6, 7 and 10 in Long Island City before a number of prominent engineers, architects and contractors. There long and heavy precast concrete piles of a make known as the "Giant" were driven 33 feet into very hard ground by severe hammering.

The piles were 44 feet long and 16 inches square with chamfered corners and were each reinforced with four 7-8-inch square twisted steel bars and a 400-pound pyramidal cast-iron driving point. They were driven by a double-acting No. O "Union" steam hammer making 110 strokes per minute and operated by a three drum, three-spool 60 h.p. Lidgerwood steam hoisting engine on the platform of a special steel tower.

Preliminary exploration borings had indicated the soil to consist of 13½ feet of fill, 10 feet stiff blue clay, 3-feet silt, 8-feet compact fine blue sand, 6-feet hard clay and 1 foot sand and clay

overlying the rock. One of the piles was driven without the assistance of a water jet, one was driven with a jet under a hydrant pressure, and the third was driven with a jet under pump pressure, but no difference was observed in the driving of the three piles. The piles penetrated 26½ feet through the fill, the blue clay and the silt under a very few hammer blows in a total time of 4 minutes, after which the penetration through about 6½ feet of the compact fine blue sand was very slow and difficult, involving unusually heavy punishment for the piles, which was intentionally maintained for about 30 minutes of continuous driving to show their high degree of resistance and was finally discontinued when the pile was only moving at the rate of 1 inch penetration for 565 blows.

One of the piles was withdrawn for about two-thirds of its length without injury and then broke in several places under the very heavy tension force applied. The second pile was also withdrawn without injury for about two-thirds of its length when the pulling tackle failed and after the latter had been reinforced and supplemented by a 350-gallon hydraulic jet at 250 pounds pressure, the pile was completely withdrawn and proved to be in perfect condition except where fractured by the eccentric pull of the hoisting engine with its different drums operating on a 12-part tackle and on two single lines. With these powerful stresses; it required about one hour to withdraw the pile.



SPECIAL STEEL TOWER ADJUSTABLE TRANSVERSELY ON LONG PIPE ROLLERS

SPECIAL STRUCTURAL FEATURES

The reinforcement rods, which projected beyond the top of the pile to bond with the concrete superstructure, were hooked at the bottom into the cast-iron driving point, and were embedded in the corners of the pile about $2\frac{1}{2}$ inches from the surface. Opposite sides of the driving point projected beyond the corresponding faces of the pile to give bearing for the lower ends of two duplicate full-length, heavy channel-shape detachable driving bars with clearance between them and the faces of the pile, that were connected, with clearance above the top of the pile, by a heavy steel driving cap that received the hammer blow and transmitted it to the driving point without impact or compression of the concrete and acted to pull the latter down into the ground.

The arrangement of the driving bars provided for the complete protection of four 2-inch jet pipes in the spaces made vacant by chamfering the corners of the concrete pile. The lower ends of these pipes engaged sockets in the cast-iron driving point and communicated with outlets through which the jet could be applied to the soil below and around the pile permitting the return water to flow up to the surface of the ground between the driving bars and the surface of the pile, without danger of scouring the ground outside the driving bars. It is also possible to drive

the piles with jets arranged outside the driving bars if preferable. After the driving has been completed, the driving bars are detached and removed and, if the earth does not immediately close in, as usual, to fill the space around the pile vacated by the bars, the voids can easily be filled with sand puddled by flowing water and giving a large degree of resistance to displacement of the pile.

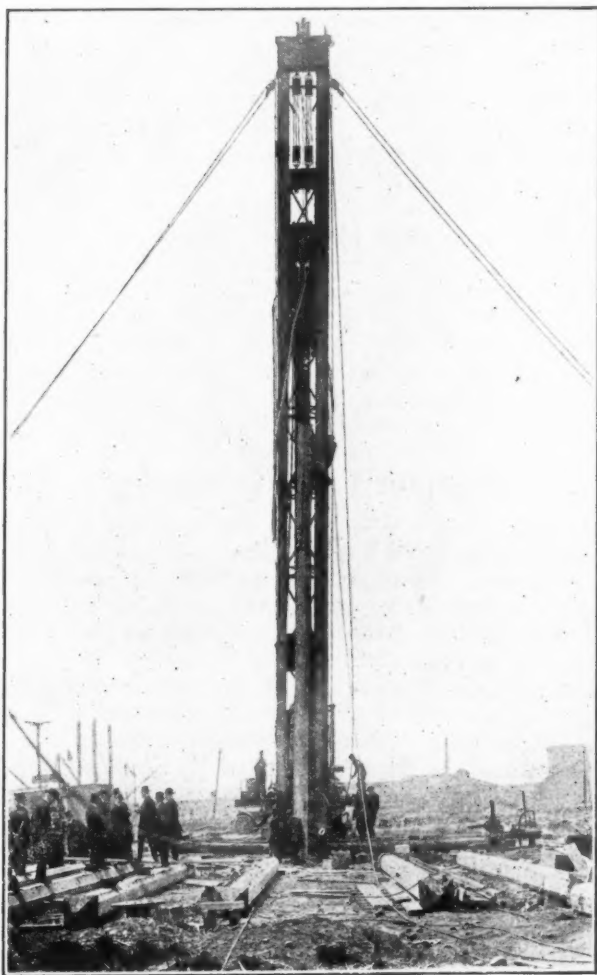
FROZEN PILES

Piles were made with 1:2:4 concrete composed of Portland cement, graded sand, and crushed trap rock from $\frac{3}{4}$ inch to $\frac{1}{4}$ inch in diameter. They were cast at temperatures varying from 20 to 33 degrees Fahrenheit and although all of them were frozen, they were not cured with steam as is frequently customary in cold weather, because it was intended to demonstrate that with this method of driving, the freezing of concrete was not unpermissible. The long and heavy piles were handled by a tackle attached at a single point and the cracking thus occasioned might have been avoided if the lifting tackle had been attached at 3 points, as is often done.

ENGINE AND TOWER

The 60-h. p., 3-drum, 3-spool Lidgerwood hoisting engine used to handle the piles and the steam hammer, was mounted on the platform of a special steel tower having a capacity for driving piles up to 24-inches square and 65 feet long.

The tower was made of riveted angles on a heavy I-beam platform that had special transverse roller bearings locked to a pair of long steel tubes, one at each end of the platform, under the



PRECAST CONCRETE PILE IN WAYS OF SPECIAL FOOT OF CONCRETE PILE UNINJURED AFTER VERY HEAVY DRIVING AND PULLING



centers of the tower and the hoisting engine respectively, thus giving the apparatus a transverse base about 40 feet in length. Longitudinal motion was secured by rolling the long tubes, and transverse motion by hauling the tower from end to end with tackles attached on each side as shown in the illustration. This enabled the tower to be easily and quickly adjusted for different positions of the piles and to drive a large number of piles in a single cluster or in multiple rows close together. The apparatus is so arranged as to permit the application of about 30 tons of its weight to the pile while the latter is being driven, thus considerably facilitating its penetration, especially in soft soil.

Besides the result shown in this demonstration, the efficiency of the pile and driving system have been shown on U. S. Government work at Wilmington, N. C., where Giant piles of the same size were driven through 6 feet of massive brick engine foundation, 18 inches of long leaf yellow pine grillage, 5 feet of stiff blue clay, 5½ feet of sticky blue clay, 2 feet of sandy clay and 3 feet into coral rock.

Labor Notes

Safeguarding Immigration

The U. S. Public Health regulations require physical examination and medical certificates of good health, cleanliness and freedom from contagious diseases to be certified to at the port of foreign embarkation. Because these regulations have been neglected or misunderstood at some foreign ports, there are now being daily detained on their arrival at the port of New York more than 1,000 Italian immigrants who are quarantined at Hoffman Island, where they are examined, tested, vaccinated, deloused, if necessary, bathed and finally passed after a detention of 24 hours or more as required. Their clothing and baggage are sterilized by steam and they are afterwards transferred to Ellis Island for examination by the immigration authorities.

Increasing Arrivals

In the week ending July 24th, sixteen ocean liners delivered 13,970 immigrants to the port of New York. They represent most of the European countries, excepting those which were opposed to us in the war. They include many able-bodied men and numerous families and, unlike the immigrants arriving before the war, who in large quantities remained in New York, are generally definitely decided to go to some inland points.

Transient Immigrants

A few days ago there passed through New York a trainload of 530 Chinamen enroute from Montreal to Cuba via the Ward Line Steamship. They were escorted by a guard of 20 men and practically passed through the city in bond, under an agreement of the authorities that none should be permitted to escape and remain in this

country, although the penalty was not comparable with that of about \$1,000 for each individual that might stray from the party during the trip through Canadian territory from Vancouver to the United States boundary.

The immigrants represented all classes of Chinamen, from servants to merchants and students, excepting the typical coolie laborers.

Such shipments have been frequent for many years and go to show and call attention to the almost inexhaustible supply of labor of all kinds which we well might draw from the 800,000,000 inhabitants of the Chinese Empire, were it not for the absurd and mischievous restrictions that have been demanded and secured for political capital on account of labor union selfishness and jealousy.

The Chinese are willing, faithful and notably honest and under proper regulation the admission of a large number of selected immigrants from their numbers, far from interfering with native labor or lowering its standards and rewards, would relieve them of much of the work that they refuse to do and tend to still further classify and specialize labor so that it would be pleasanter, more efficient and better paid.

100,000 Potential Immigrants

A commission from Russia including a civil engineer, the head of a large hospital, and two university professors, now visiting the United States, is looking for locations for 100,000 destitute Mennonites of the Russian Ukraine, formerly members of the wealthy Russian aristocracy in a rich agricultural section, who have been ruined by the political disasters in Russia and are seeking new homes in America, Australia and Africa.

Their property has been confiscated and pillaged to a large extent and they are desirous to sell the remainder at any price and seek new countries. About 80 per cent of the colony are farmers with holdings of 180 to 60,000 acres and would probably make useful productive citizens with a wholesome hatred of bolshevism, socialism, and all other kinds of pernicious radicalism.

Surplus Labor in Hamburg

According to the U. S. daily consular report of July 21, there were on June 12th, 35,028 unemployed male and female workers in Hamburg, which showed an increase of 1,823 over the preceding week. Although only classified workmen are included in the list, it indicates a considerable surplus of labor and a positive supply of workers for this country. Presumably those of the least skill in their various industries form the bulk of the unemployed and many of them may perhaps be below the rank of mechanics and well suited for ordinary unskilled labor in this country. Among the largest groups of unemployed males are 3,493 in metal and machinery industries, 1,126 in wood industries, 2,351 in food stuff industries, 1,261 in building trades, 1,315 machinists and factory workers, 3,645 commercial trades and 12,144 paid workers and household help.

Recent Legal Decisions

STATUTE REQUIRING TWO SURETIES ON BOND OF CONTRACTOR FOR SCHOOLHOUSE MUST BE FOLLOWED

The Nebraska statute requires a bond given by a contractor upon the erection of a schoolhouse to be signed by two sureties. A bond for the contractor for a schoolhouse was executed and approved signed by one surety only. A materialman furnished building material to the contractor, who failed to pay the bill. In an action by the materialman on the bond, the Montana Supreme Court holds, *Nye-Schneider-Fowler, Co. v. Roeser*, 177 N. W. 750, that the surety was entitled to rely upon the performance of the legal duty of the school board to see that a bond in accordance with the statute was executed before the contract was let, and that, the bond being of a public nature and accessible in the hands of the school board to the inspection of interested parties, no estoppel arises on the part of the surety on the ground that, the materialman having furnished the goods relying upon the bond, the surety is estopped to deny its validity. The surety who signed was under no duty to see that another surety signed the bond. The court's former opinion in the case (103 Neb. 614, 173 N. W. 605) was set aside.

"IMMEDIATE" NOTICE OF DEFAULT TO SURETY ON PAVING CONTRACT

A surety bond for a paving contractor required the owner to give immediate notice of default by the principle contractor, or of omissions by him, which would cause damage for which the surety would be liable. The Michigan Supreme Court holds, *Berkshire Land Co. v. Moran*, 177 N. W. 205, that the word "immediate" in such a provision is not used in its strict meaning as without any time intervening, or instantly; but it requires prompt enough notice to enable the surety to take available steps for its protection. Failure to give notice within a reasonable time of the contractor's default when the price of paving, labor and material were constantly and rapidly increasing, will discharge the surety. A delay of 30 days after the expiration of the time for completion in notifying the surety, through the contractor's inability to finish within the required time was apparent before its expiration, and he definitely abandoned the contract three weeks before the notice was given, was held unreasonable and discharged the surety.

ADVANCES BY BANK TO CONTRACTOR FOR LABOR AND INDUSTRIAL CLAIMS

A contractor agreed to deposit in a bank all the money he received for constructing a school building. The bank agreed to advance the money he might need to enable him to complete the building and to take his notes for the amounts advanced. Moneys so advanced, as well as money received on the contract, was to be used only to pay claims of laborers and materialmen. Pursuant to this agreement, the bank took the contractor's notes for \$5,000 and an order on the

school district for that amount, and advanced \$4,500 to pay claims for labor and materials. The contractor had given the statutory bond with surety. He failed to pay the claims of the laborers and materialmen, and also failed to pay his notes to the bank. In an action by the surety on the contractor's bond against the contractor, the school district, the bank and the holders of claims for labor and material, the Minnesota Supreme Court holds, *New Amsterdam Casualty Co. v. Murtz*, 177 N. W. 664, that the school district, having paid the bank's order was liable to the surety only to the extent of the unpaid balance of the contract price, and the surety was required to pay the remaining claims of the laborers and materialmen. The right of the bank to retain the money received from the school district was superior to the surety's right to be subrogated to the interest which laborers and materialmen had in the money retained by the school district until the contractor completed the building. The school district neglected no duty it owed the surety in honoring the bank's order, although the surety had previously notified it not to pay orders given by the contractor, since it was bound to pay the contract price under the contract.

PUBLIC IMPROVEMENT CONTRACT VALID THOUGH RESOLUTION FOR BIDS PASSED BEFORE ORDINANCE EFFECTIVE

In an action to have a contract for a street improvement declared invalid because the resolution directing the advertisement for bids, pursuant to which the contract was awarded, was passed before the expiration of 60 days after publication of the ordinance authorizing the improvement, and hence before the ordinance went into effect under the terms of the New Jersey Home Rule Act, the New Jersey Supreme Court, *Methling v. Board of Comrs. of City of Orange*, 110 Atl. 133, is of opinion that, that fact does not render the contract invalid where the date fixed in the advertisement for bids was after the ordinance became operative under the provisions of the Home Rule Act.

DOUBLE MEASUREMENTS FOR EARTH EXCAVATION BY MISSOURI STATUTE

Under the Missouri Statute of 1909, providing how measurements of earthwork, excavation, etc., shall be made in the absence of special agreement, the Missouri Supreme Court holds, *Webb-Kunze Constr. Co. v. Gylsonite Const. Co.*, 220 S. W. 857, that a contractor to excavate for a building was entitled to compensation on the basis of double measurement for trenches and pier holes as provided in the statute, despite an article of the contract and a provision in the specifications which were not inconsistent with the statute. The statute is held necessarily to apply to contracts for making earth excavations, and must be read as a part of every contract of that character.

NEWS OF THE SOCIETIES

August 14-18—ENGINEERING INSTITUTE OF CANADA, CALGARY BRANCH. Meeting at Banff. F. C. Emery, secretary. Western professional meeting, Calgary, Canada.

Sept. 7-10—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention, Holyoke, Mass., Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

Sept. 13-17—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual convention San Francisco, Cal.

Sept. 20-23—SOUTHWESTERN WATER WORKS ASSOCIATION. Annual convention, St. Charles Hotel, New Orleans, La. Secretary, E. L. Fulkerson, Waco, Texas.

Oct. 12-14—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, St. Louis, Mo. Secretary, Charles Carroll Brown, 401 Lincoln Avenue, Valparaiso, Ind.

Oct. 19-22—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. 25th annual convention, New Orleans, La. Secretary, C. R. George, Houston, Texas.

Jan. 25-27, 1921—THE AMERICAN WOOD PRESERVERS ASSOCIATION. Annual convention. Place to be announced.

SOUTHWESTERN WATER WORKS ASSOCIATION

The Association will hold its annual convention at New Orleans on September 20th to 23rd, with headquarters at the St. Charles Hotel. It is hoped and expected that this will be the best convention which the Association has yet held.

Attention is called to the fact that the date which has been given for several weeks past in our Convention calendar, September 13 to 17, is not correct, but that the Convention will be held on September 20 to 23.

ADVISORY COUNCIL TO THE BOARD OF SURVEYS AND MAPS

At a recent meeting at Washington, D. C., the organization was completed of the advisory council of the board of surveys and maps for active work during the present season in the preparation of a report to be submitted to the general meeting in Washington, September 14th.

Besides the committees on cooperation, technical standards, topographic maps, highway maps, general maps, control and information, there is an executive committee consisting of Dr. E. B. Mathews, Division of Geology and Geography, National Research Council, chairman; A. G. Seiler, American Automobile Association, secretary; Wm. A. Nelson, president of the Association of State Geologists; A. Stuart Baldwin, vice-president, Illinois Central Railroad; J. H. Milburn, office engineer, Baltimore & Ohio Railroad.

THE IOWA ENGINEERING SOCIETY

The Iowa Engineering Society has voted favorably on the admission to membership of all members of existing local organizations and action is expected to be taken in this direction next fall.

THE AMERICAN SOCIETY OF WOMEN ENGINEERS AND ARCHITECTS

In December, 1918, steps were taken for the formation of a society which has since been organized for the general and professional interests of women employed in engineering and architectural work, and for the publication of papers and other data in an official periodical.

The society, which owes its inception to female members of the university of Colorado, is intended to be representative of 200 women in the specified fields who are eligible if they are college graduates or have had the required amount of practical experience. The present membership is said to include all individuals employed in civil, electrical, chemical and architectural work. The officers are Lou Alta Melton, pres., Hilda Counts, vice-president, and Hazel I. Quick, secretary and treasurer.

AMERICAN ASSOCIATION OF ENGINEERS

As a result of the efforts of the Boston chapter of the American Association of Engineers, the employees of the state highway division of the Massachusetts department of public work have been granted an increase in salary averaging 20 per cent and effective on June 1, 1920. Other engineering departments were given an increase which is reported to average about 12 per cent.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

The annual convention of the American Society for Municipal Improvements will be held at St. Louis, Oct. 11-15. The convention officials are being aided by six committees of local engineers and contractors, including representatives of the municipal departments. The mayor of the city has invited mayors and municipal officials throughout the country to attend the meeting and special conferences will be arranged for them. The president of the board of Public Service has also invited more than 3,000 engineers throughout the country.

PAN-PACIFIC SCIENTIFIC CONGRESS

Convention to be held in Honolulu, Hawaii, Aug. 2-20.

SOCIETY OF MILITARY ENGINEERS

The first annual meeting of the Society of American Military Engineers will be held in Washington, January 14. The temporary board of directors at a meeting on June 2, perfected the preliminary organization and elected as officers to serve until the annual meeting. Directors, Cols. F. V. Abbot, F. A. Molitor, George D. Synder; Lt. Cols. C. H. Birdseye, A. H. Brooks, J. H. Finney, H. S. Graves, W. W. Kirby, Geo. B. Pillsbury, Glenn Smith, Evarts Tracy, G. A. Youngberg; Majors, Percy E. Barbour, P.

S. Bond, J. J. Kingman, Max C. Tyler, E. Tufts; Capt. D. McCoach; Executive committee, Maj.-Gen. Black, Cols. Brooks, Graves, Major Tufts and Capt. Weart; Committees: Development, Major Bond, chairman; Cols. Molitor, Snyder; Lt.-Col. Finney, Major Barbour. Design of Emblem, Lt.-Cols. Youngberg, and Tracy. Membership, Lt.-Col. Youngberg, Majors, Edwin H. Marks, William J. Shea and Capt. Thomas H. Messer.

ASSOCIATION OF PROFESSIONAL ENGINEERS OF ALBERTA

The first general meeting and organization session of the Association of Professional Engineers of Alberta, Canada was held at Calgary, July 10 in accordance with an act of the Legislature of the Province of Alberta. The membership of more than 100 engineers has been enrolled and there were elected as officers, President, F. H. Peters, commissioner of irrigation; vice-president, L. E. Drummond, consulting engineer and manager; registrar and secretary, R. S. L. Wilson, professor of civil and municipal engineering University of Alberta, Edmonton. Councillors: S. G. Porter, R. J. Gibb, and R. A. Brown.

TEXAS WATERWORKS ASSOCIATION

A meeting of the Texas Waterworks Association, was held in Austin, July 20. Prof. R. G. Tyler, engineer of the University of Texas presiding. Among the papers presented was one by H. E. Elrod, Dallas, Texas, on the cost of water mains, selection and cost of power plants and distributing systems for small towns.

NEW ENGLAND WATERWORKS ASSOCIATION

The 39th annual convention of the New England Water-Works Association will be held at Holyoke, Mass. Sept. 7-10th, where there will be provided in the City Hall a 75x96-foot exhibit and meeting room in which allotments of 20 square feet each will be allowed to each member of the Waterworks Manufacturers' Association. Additional space can be secured at the uniform rate per square foot, and electric current at 110 volts can be supplied. For particulars and application, address Burt B. Hodgman, chairman exhibit committee, Waterworks Manufacturers' Association, 50 Church Street, New York.

PERSONALS

Wilkes, Edmunds, has opened a structural engineering office in Kansas City, Mo.

Murry, R. H., has been appointed director of the Division of Sanitation of the Bureau of Public Health of Saskatchewan, Canada.

Rose, H. C. has been appointed resident engineer of Provincial highway in Western Ontario, Canada with headquarters at Guelph.

Ennis, W. D., has resigned the position of professor of engineering in the U. S. Naval academy, Annapolis, to become vice-president of the Technical Advisory Corporation of New York.

(Continued on page 142)

New Appliances

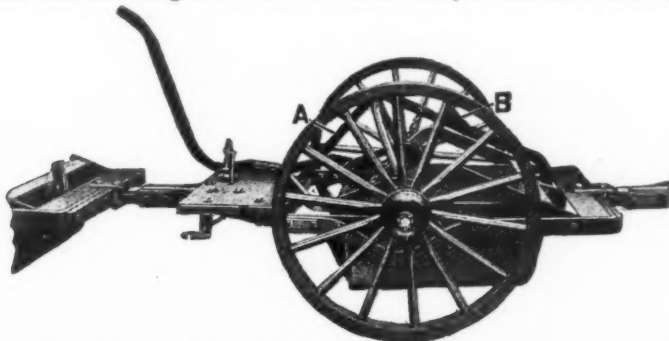
Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

MULTI-UNIT WHEEL SCRAPERS

The Roytrack multi-unit wheel scrapers made by the Smith & Sons Manufacturing Company, are designed to be operated tamden in trains hauled by a tractor. Any number of scrapers, according to the conditions of digging and the horse-power of the tractor at the draw bar, can be operated by one man attending to the tractor

to carrying position by moving and locking the control lever preferably while the tractor is in motion.

When the trip-latch-rod is pulled, the bowl is lowered to the ground and the draft of the tractor causes the rear end of the pan to rise and move forward, dumping the load. When several scrapers are used tamden, the best results are obtained by releasing the lock after each scraper has been loaded. The



MULTI-UNIT WHEEL SCRAPER WITH ARCHED AXLE AND PROTECTED SPINDLES

and another attending to the scrapers.

The scrapers have high carbon steel bowls, steel axles and steel wheels with bearings protected from dirt and dust. Before starting to load, the bowl is locked in clearance position. When it is released by the control lever, the bowl is shifted to engage the earth and when it has been filled, it is raised

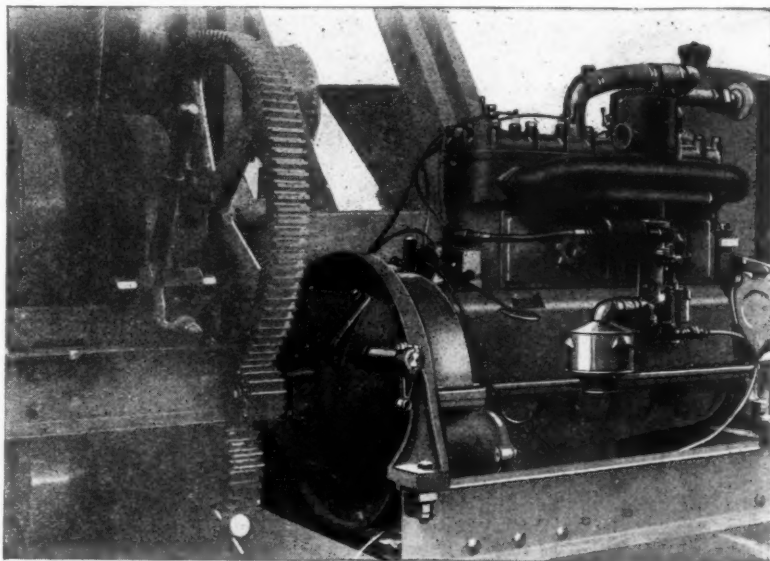
pan will then be held in place by the control lever until the operator, standing at any required point can dump them as they pass without mounting them or stopping the tractor.

The scrapers are made in four sizes with 9, 12, 14 and 16 cubic feet capacity and weight 725, 950, 1150, and 1250 pounds each respectively.

GASOLINE PAVING MIXERS

The 1920 Smith simplex paving mixer with gasoline equipment has been designed by the manufacturers in an effort to secure the most economical and convenient fuel obtainable. Their engineers have studied conditions and construction problems for years and

have developed details that they consider to be very successful and recommend unreservedly to road and pavement contractors. It is believed to overcome troubles that previously seemed to baffle designers and discouraged previous attempts to adapt gasoline engines to paving machines.



GASOLINE SIMPLEX PAVING MIXER

SHUVELODER

The "Shuveloder" is a "medical mucker" that has been designed and perfected and is now put on the market by the Lake Superior Loader Company. It is of simple, compact, sturdy construction designed especially for loading muck in the limited headroom and small clearance of tunnels, drifts and cuts.

The machine is mounted on a turntable carried by a truck running on short lengths of portable track put down in front as it advances. It has capacity for pieces of rock up to the size of the 30-inch bucket and can dig far enough below the level of the track to handle more than 95 per cent of the muck from an 11-foot drift without assistance of trammers.

It can be operated in a drift 5-feet wide and 7 feet high, can reach 5½ feet each side the center line of the track, and can be transported complete through a 4½x4½-foot drift. It will load into any ordinary tram car not exceeding 50 inches in height above top of rail.

The bucket is operated by four pneumatic cylinders working directly without gears, chains, clutches, belts, conveyors, or engines, thus producing great simplicity and a minimum number of moving parts.

The machine is controlled by three hand levers on one side. They govern the plungers in the cylinder, that, with links and a rope on the revolving shaft, push the bucket or dipper forward into the bottom of the muck pile where it is given a crowding stroke followed by a digging stroke that carries it up to horizontal, after which the bucket and its arms are moved back in horizontal where the bucket is elevated and guides to the rear of the machine, reverses to dump into the car and then returns for another load. When swung transversely by the hand-operated swinging gear, the bucket will reach 5½-feet from the center line of the track and, under all circumstances, discharges into the center of the attendant car.

When the bucket strikes a solid obstruction it will automatically dig over it without stalling. If the bucket is momentarily retarded, the development of air pressure in the cylinder is prevented by the oil filling in the hollow plungers.

The machine is so light that it is readily propelled forward and back by hand, thus obviating the expense and complication of mechanical traction. It can be moved thus as easily as an ordinary 2-ton loaded tram car. The machine is handled and the cars loaded by one operator and the number of additional men required is determined principally by the rate at which the empty cars can be delivered to the machine.

The machine is 4-feet wide, 4-feet high and 6-feet long, weighs 4,300 pounds and has a loading capacity of 45 tons per hour. It consumes from

150 to 175 feet of free air per minute at 80 pounds pressure, and has a bucket capacity of 4.45 cubic feet. The headroom required for operation is 6 feet 10 inches.

INDUSTRIAL NOTES

W. G. THOMPSON ASSOCIATED WITH LAKEWOOD ENGINEERING COMPANY

The Lakewood Engineering Company announces the association of W. G. Thompson, formerly state highway engineer of New Jersey, with their New York City office at 141 Centre street.

Mr. Thompson's experience includes general civil engineering work, waterworks and street railway location and construction in private practice, dredging and breakwater work for the federal government, five years experience in survey and construction work on the Panama Canal, work in the chief engineering office of the Oregon & Washington Railroad, and concrete pile construction up to 1917, when he was appointed assistant state highway engineer of New Jersey, and in 1918 became state highway engineer in full charge of the state highway department and its work.

2000-PARKER MOTOR TRUCK CON- TRACT

The Parker Motor Truck Company, Milwaukee, announces the closing of a contract with the Wilson & Vevea Corporation, New York City, involving the distribution of two thousand trucks.

The Wilson & Vevea Corporation are jobbers and will represent the Parker line in eight Eastern States. Dealers will immediately be established in principal cities, and truck deliveries will start August 1st.

FIRE DAMAGED QUICKLY RE- PAIRED

The United States Asphalt Refining Co., New York, writes. On July 19th one of our tanks containing a storage of crude oil was struck by lightning. The fire was very stubborn and burned for several days, and three tanks of crude oil was consumed, also the laboratory. The remaining portion of the refinery and other storage of oil were saved after a hard fight. Property adjacent to the refinery was also damaged to a great extent.

After cleaning up, manufacturing and shipments will be resumed as usual by end of week.

Very truly yours,

THE U. S. ASPHALT REFINING CO.

DWIGHT P. ROBINSON & CO., INC.

Dwight P. Robinson & Co., Inc., and Westinghouse, Church, Kerr & Co., Inc., have consolidated under the name of Dwight P. Robinson & Co., Inc. thus uniting two large organizations of engineers and practical builders with many years experience in large and difficult undertakings.

Dwight P. Robinson & Co., Inc., has specialized in designing and construction of steam power plants, hydro-electric developments, transmission

systems, steel mills, reinforced concrete and steel structures.

Westinghouse, Church, Kerr & Co., Inc., has had 36 years experience in the design and construction of industrial plants of every type, shops, foundries, railroad terminals, electrical and industrial power plant. Offices of the new firm are at 125 E. 46th St., New York, and at Chicago, Pittsburg, Cleveland and Dallas.

LOUIS M. LAYNE

Louis M. Layne, vice-president of the Layne & Bowler Company, Memphis, Tenn., and of Layne & Bowler Corporation, Los Angeles, Calif., died June 27th.

SPECIAL USES FOR TARVIA

The Barrett Company has just issued an attractive pamphlet with the above title that is devoted to the presentation of valuable information concerning problems that confront the engineer and street superintendent in the maintenance of highways.

Among the various topics considered are, Tarvia for the repair and maintenance of concrete, Surface coats on concrete. The repair and maintenance of bituminous macadam and other bituminous surfaces. Repair and maintenance of macadam surfaces. The use of tarvia over worn brick pavements, Tarvia for shoulders, cold patching with tarvia—k.p., Protective surfaces on plank bridge floors, Treatment of wood block pavements with tarvia-B, Tarvia bound bases, Treatment of slippery pavements with tarvia-B and sand Treatment of walks and pathways in parks, cemeteries and private estates with tarvia, Treatment of gravel and shell roads, Tarvia for gutters and waterways, Tarvia on gravel roads, Tarvia service department and free literature.

Detailed descriptions are given of the methods, operations and materials required for different kinds of repairs and construction and are illustrated by engravings of work in progress and finished roads; besides which, there are notices of various pamphlets that will be sent on application covering such subjects as how a tarvia-macadam roadway is constructed, tarvia for bridge floors, good roads at low cost tarvia, and several others of a similar character.

WATERING DOWN THE ROAD

Under this title the C. H. & E. Company, Inc., issue an attractive circular, printed in colors and devoted chiefly to single-acting triplex plunger pumps that are adapted for construction purposes, especially to provide water for concrete mixing and for sprinkling newly finished roads.

These pumps, mounted on trucks are easily shifted from place to place and being geared direct to the engines, do not require constant attendance of an operator. The plungers are outside packed and thus are not affected by gritty water.

Illustrations are given of the pumps themselves and of their installation on a roadbuilding job where they delivered water through a 2-inch pipe for a distance of 3 3/4 miles at an elevation

of 100 feet to provide for the concrete mixer and for the road watering.

The pumps, being operated with kerosine oil, do not require a licensed engineer. The use of a duplex outfit, composed of a pair of duplicate triplex pumps mounted on a truck and operating independently, is strongly recommended to save time in case of accidents or interruption of one pump and to provide double efficiency by using both pumps simultaneously if desirable. The pumps can also be equipped with a gasoline engine which, connected to the standard 3 1/2 x 4-inch triplex pump, has a capacity of 40 gallons per minute to a maximum pressure of 200 pounds.

Where water must be raised from more than 20 feet below the surface, a deep-well working-head must be installed to raise it to the surface. The working head is operated by a belt from the pump engine and drives a pump rod connected to the plunger in the submerged cylinder, thus raising the water to the tank on the surface, from which it is pumped in the usual manner, through the pipe line.

PERSONALS

(Continued from page 140)

Murray, F. H. and J. R. Pennel have opened an engineering office in Charleston, S. C.

Moorefield, Chas. H., has been appointed state highway engineer of South Carolina.

Hammond, R. H. and F. H. Frauens, Jr., have organized the engineering firm of W. B. Rollins & Company, Kansas, Mo.

Berg, John, has been appointed state engineer of South Dakota.

Alden, H. W., is the representative of the Society of Automotive Engineers on the Federal Highway Council committee on transportation and on the committee on subgrade in relation to road surfacing.

Holland, W. E., has organized the waterworks construction firm of Cole & Holland, South Bend, Ind.

Buck, M. M., has opened an engineering office in Ottawa County, Mich.

Borck, Geo., has been appointed road engineer of Ottawa County, Mich.

Eavenson, H. N., has opened a mining engineering office in Pittsburg, Pa.

Thompson, W. L., has been appointed chief engineer of the Mississippi Levee Commission, Vicksburg, Miss.

Kelly, M. E., has been appointed assistant engineer for federal government improvements on the Virgin Islands.

Somerville, Robert, has been appointed assistant chief engineer of the Mississippi Levee Commission.

Heman, A. H., a contractor for much important public works in St. Louis, died at his home there July 3rd.

Hatton, H. W., died at Wilmington, Del., July 13.

Churchill, E. C., assistant division engineer of the Lehigh Valley Railroad died July 9.

Kelly, Lieut. Col. William of the U. S. Corps of Engineers, has been appointed engineer officers on the federal power commission.